

REMARKS

I. Introduction

With the cancellation of claim 9 and addition of claim 16, claims 1 to 7, 10 to 12, and 14 to 16 are currently pending in this application. In view of the following remarks, it is respectfully submitted that all of the presently pending claims are allowable, and reconsideration is respectfully requested.

Applicants note with appreciation the acknowledgment of the claim for foreign priority and the indication that all of the certified copies of the priority documents have been received.

Applicants thank the Examiner for considering the previously filed Information Disclosure Statement, PTO-1440 paper and cited references (as indicated on the Office Action Summary Sheet of May 20, 2003).

II. Objection to the Drawings

The drawings were objected to under 37 C.F.R. § 1.83 (b) because they allegedly "fail to show the groove/bore/channel/depths/spacings at any specific area of the casting die body. . .that would be adequate to show a heat flow rate of 5-40% greater than the heat flow rate in adjacent regions of the casting die body, as set forth in claims 1, 6, 7, 9-12, 14, and 15." Office Action at p. 1. Applicants submit that the drawings, as amended, overcome the present objection to the drawings.

Original Figure 1 has been relabeled Figure 2 and has been amended to include line 3T indicating the transverse cross section line of Figure 3. The pouring direction label "GD" has also been changed to "PD." A new Figure 1 has been added showing a top view of the casting die body 10 including die plates 1 and narrow-side walls 12. Original Figure 1b has been relabeled Figure 3 and now shows bore holes 14 and includes cross hatching and reference no. 4 for the pouring surface. The figures included in Figure 2 have been separated to two figures labeled Figures 4 and 5. A reference no. 4 has been added to Figure 5 to show the pouring surface and a reference no. 16 has been added to both Figures 4 and 5 to show the cooling surface.

No new matter has been added. Regarding the addition of Figure 1, original claim 3, for example, recites that the casting die includes a die cavity which is composed of two broad-side walls (shown as element 1) situated opposite each

other and narrow-side walls (shown as element 12) limiting the width of the billet. See also the reference in the Specification to the "plane-parallel sides of the casting cross section" at p. 3, lines 20 to 21 and the discussion of the casting die plate 1 on p. 6.

Regarding the conversion of the original Figure 1(b) to Figure 3, the view has been changed from a top view (as presented originally) to a cross sectional view taken along line 3T in Figure 2. The cross sectional view allows for viewing of the cooling bore holes 14, which are not visible from the top view, as the holes do not extend the entire height of the die plate 1.

Regarding the cooling bore holes, the Specification specifically states on page 5, lines 15 to 24 that, as with the cooling channels, the bore holes can be made narrower, spaced closer and brought closer to the pouring surface in the supercritically stressed areas on both sides of the funnel so as to make the cooling surface effectively larger in those areas. See also original claims 12 to 15.

Regarding the reference to the cooling surface 16 in Figure 5 (previously Figure 2) see, for example, the Specification at p. 6, line 12.

Therefore, withdrawal of the objection to the drawings is respectfully requested.

III. Objection to the Claims

Claim 1 was objected to because of an alleged informality. Office Action at p. 4. Applicant respectfully submits that claim 1, as amended, overcomes the present objection. Therefore, withdrawal of the objection and allowance of claim 1 is respectfully requested.

IV. Objection to the Specification and Rejection of Claims 1 to 7, 9 to 12, 14 and 15 under 35 U.S.C. §112, 2nd ¶

The Specification was objected to under 37 C.F.R. §1.75 (d)(1) as allegedly failing to provide proper antecedent basis for the claimed subject matter. Further, claims 1 to 7, 9 to 12, 14 and 15 were rejected, on the same grounds as the objections, under 35 U.S.C. § 112, second paragraph as indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as their invention. Claim 9 has been canceled thus rendering the rejection of this

claim moot.

With respect to claims 1 and 9, the Office Action alleges that the language “adjacent regions of the casting body” is an indefinite structural feature that is not distinctly set forth in the disclosure, as “adjacent regions of the casting die body” cannot be treated as an entire equivalent region outside the “cooling zone having a rate of heat flow 5-40% greater.” See Office Action at pages 3 and 5 to 6. Applicants respectfully disagree. The Office Action alleges that “the properties of a “remainder of the surface” that is only a distance of 5 cm from the “cooling zone” are not equivalent to an area 50 cm from the “cooling zone” in terms of temperature, heat flow, and thermal/mechanical stresses etc., and thus, regions within the “cooling zone” would allegedly have widely differing rates of heat flow than the “remainder of the surface” regions. Office Action at pages 3 and 5 to 6. Respectfully, even if an area 5 cm away may not, for example, have the same temperature, heat flow, etc. as an area 50 cm away from the “cooling zone” does not in any way affect the fact that an area in the cool zone has a heat flow of 5-40% greater than an area out of the “cooling zone.” The heat flow in the area 5 cm away and the area 50 cm away do not have to have the same heat flow (as implied by the Office Action) but rather each must have a heat flow 5-40% less than in the “cooling zone.” Notwithstanding the above, claim 1 has been amended removing reference to the objected to “adjacent regions” language, thus rendering these objections moot.

Further in regard to claim 1, the Office Action objected to the use of “meniscus,” which the Office Action alleges has not been positively and distinctly claimed as being in any particular region of the casting die. Office Action at pages 3 and 5. Applicants respectfully submit that it would have been reasonably clear to one skilled in the art at the time of filing of the application where a meniscus region is in a liquid-cooled casting die for a continuous casting installation. See for example, the Specification and claim 2 of U.S. Patent No. 5,927,378, cited by the Examiner. Notwithstanding the above, claim 1 has been amended removing reference to the objected to “meniscus region” language, thus rendering this objection moot. Therefore, withdrawal of the objection to the Specification and rejection of claim 1 under 35 U.S.C. § 112 is respectfully requested.

With regard to claims 10 and 11, the Office Action alleges that it is

unclear whether or not the “thickness” in “other areas” of claim 11 are of a constant value, as claim 10 recites that the “thickness” is reduced. Office Action at pages 3 and 6. The second paragraph of 35 U.S.C. § 112 merely requires that the claims set out and circumscribe a particular subject matter with a reasonable degree of clarity and particularity. As provided in M.P.E.P. § 2173.02, the “focus during examination of claims for compliance with the requirement for definiteness of 35 U.S.C. 112, second paragraph is whether the claim meets the threshold requirement of clarity and precision.” In this regard, the “essential inquiry pertaining to this requirement is whether the claims set out and circumscribe a particular subject matter with a reasonable degree of clarity and particularity.” *Id.* (emphasis added). “Definiteness of claim language must be analyzed, not in a vacuum, but in light of [, *inter alia*, the] content of the particular application disclosure [and the] claim interpretation that would be given by one possessing the ordinary level of skill in the pertinent art at the time the invention was made.” *Id.* If the claims, when read in light of the Specification, reasonably apprise those skilled in the art both of the utilization and scope of the invention, and if the language is as precise as the subject matter permits, the second paragraph of 35 U.S.C. § 112 demands no more. M.P.E.P. § 2173.05(a) (citing *Shatterproof Glass Corp. v. Libbey Owens Ford Co.*, 758 F.2d 613, 225 U.S.P.Q. 634 (Fed. Cir. 1985)). Applicants submit that it would have been reasonably clear to one skilled in the art at the time of filing of the application that a reduced thickness means that at least a portion of the thickness in the “at least one portion of the die body,” as recited in amended claims 10 and 11, is smaller than outside this area, regardless of whether the thickness is constant or tapering. Therefore, withdrawal of this objection to the Specification and rejection of claims 10 and 11 under 35 U.S.C. § 112 is respectfully requested.

In regard to claim 14, the Office Action alleges that the terms “transitional area” and “gradually narrower” are unclear and render the claim indefinite. The Office Action alleges that it remains unclear with respect to what direction the channels/bore holes become “gradually narrower.” Office Action at p. 4 and page 6 to 7. Applicant submits that it would have been reasonably clear to one skilled in the art at the time of filing of the application that the channels/bore holes become “gradually narrower” as they approach the critical area from non-critical areas shown to both on both sides of the critical area. Notwithstanding the

above, Applicant submits that this objected to language has been removed from claim 14. Therefore, withdrawal of this objection to the Specification and rejection of claim 14 under 35 U.S.C. § 112 is respectfully requested.

In regard to claim 15, the Office Action alleges that it is unclear what the difference is between a "coolant channel" and "coolant bore holes." Office Action at p. 6. Applicants respectfully submit that it would have been reasonably clear to one skilled in the art at the time of filing of the application what the difference is between a bore hole and a groove on a surface. The cooling grooves are on the cooling surface (see, for example, the Specification at p. 6, lines 10 to 19 and original Figure 2) and the cooling bore holes run in the casting die plate (see, for example, original claim 15).

In summary, Applicants respectfully submit that the Specification and claims, as amended, overcomes the present objection to the Specification and rejection under 35 U.S.C. § 112. No new matter has been added. Therefore, withdrawal of the objection to the Specification and the rejection under 35 U.S.C. § 112. and allowance of claims 1 to 7, 10 to 12, 14 and 15 is respectfully requested.

V. Rejection of Claims 1 to 7, 9 to 12, 14 and 15 Under 35 U.S.C. § 103(a)

Claims 1 to 7, 9 to 12, 14 and 15 were rejected under 35 U.S.C. § 103 (a) as unpatentable over U.S. Patent No. 5,927,378 ("Grove et al."). Claim 9 has been canceled thus rendering the rejection of this claim moot. Applicants respectfully submit that claims 1 to 7, 10 to 12, 14 and 15 are not rendered unpatentable by Grove et al. for the following reasons.

Claim 1 relates to a liquid-cooled casting die for continuous billet casting. Claim 1 recites that the casting die includes a form-giving casting die body (1) having at least one broad side wall with a pouring-surface for receiving molten metal in a pouring direction, a cooling-surface in contact with a cooling bath, the pouring-surface and the cooling-surface defining a thickness. Claim 1 has been amended to recite that the cooling bore holes run parallel to the pouring direction and at least one of run closer to the pouring surface, are configured narrower, and are spaced closer in at least one portion of the die body. No new matter has been added. The Specification specifically states on page 5, lines 15 to 24 that, as with the cooling channels, the bore holes can be made narrower, spaced closer and

brought closer to the pouring surface in the supercritically stressed areas on both sides of the funnel so as to make the cooling surface effectively larger in those areas. See also original claims 12 to 15.

Grove et al. purportedly relate to a continuous casting mold and method. The casting mold is stated to include die plates including cooling slots 36 defined in the mold liner assembly 30 for conducting heat away from the inner surface 32 of the mold liner assembly 30. See col. 3, lines 29 to 31. T_m is stated to be the thickness at the deepened slot portion 40 and T_b is stated to be the thickness at the deepened slot portion 38. See col. 3, lines 55 to 56. The distance $T_b - T_m$ is stated to be varied along the horizontal extent of the mold so as to selectively direct enhanced cooling to certain portions of the inner surface of the mold liner assembly, and, to direct a diminished cooling effect to other portions of the mold liner assembly. See col. 3, line 66 to col. 4, line 4. Nowhere, however, do Grove et al. disclose, or even suggest, cooling bore holes running parallel to the pouring direction and at least one of running closer to the pouring surface, being configured narrower, and being spaced closer in at least one portion of the die body, as recited in amended claim 1. Applicants respectfully submit that slots on a surface are not the same as bore holes.

In rejecting a claim under 35 U.S.C. § 103(a), the Examiner bears the initial burden of presenting a prima facie case of obviousness. In re Rijckaert, 9 F.3d 1531, 1532, 28 U.S.P.Q.2d 1955, 1956 (Fed. Cir. 1993). To establish prima facie obviousness, three criteria must be satisfied. First, there must be some suggestion or motivation to modify or combine reference teachings. In re Fine, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988). This teaching or suggestion to make the claimed combination must be found in the prior art and not based on the application disclosure. In re Vaeck, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991). Second, there must be a reasonable expectation of success. In re Merck & Co., Inc., 800 F.2d 1091, 231 U.S.P.Q. 375 (Fed. Cir. 1986). Third, the prior art reference(s) must teach or suggest all of the claim limitations. In re Royka, 490 F.2d 981, 180 U.S.P.Q. 580 (C.C.P.A. 1974). As indicated above, Grove et al. do not disclose, or even suggest, cooling bore holes running parallel to the pouring direction and at least one of running closer to the pouring surface, being configured narrower, and being spaced closer in at least one portion of the die body, as recited

in amended claim 1. Therefore, Grove et al. do not render obvious claim 1.

As for claims 2 to 7, 10 to 12, 14 and 15, which ultimately depend on amended claim 1 and therefore include all of the limitations of amended claim 1, Applicants submit that these claims are patentable for at least the same reasons provided above in support of amended claim 1. *In re Fine, supra* (any dependent claim depending from a non-obvious independent claim is non-obvious). Accordingly, withdrawal of the 35 U.S.C. § 103(a) rejection and allowance of claims 2 to 7, 10 to 12, 14 and 15 are respectfully requested.

VI. Rejection of Claims 1 and 9 Under 35 U.S.C. § 103(a)

Claims 1 and 9 were rejected under 35 U.S.C. § 103 (a) as unpatentable over U.S. Patent No. 5,797,444 ("Villanueva et al."). Claim 9 has been canceled thus rendering the rejection of this claim moot. Applicants respectfully submit that claim 1 is not rendered unpatentable by Villanueva et al. for the following reasons.

Applicants respectfully submit that Villanueva et al. is disqualified as prior art under 35 U.S.C. § 103(c) for the purposes of determining obviousness under 35 U.S.C. § 103(a). The present application was filed in the United States Patent and Trademark Office on **August 11, 1999** and claims foreign priority to Application No. 198 02 809.1, a certified translation of which is being filed herewith, filed in the Federal Republic of Germany on **January 27, 1998**. Because a CPA of the present application was filed on **May 6, 2003** subsequent to November 29, 1999, the provisions of 35 U.S.C. § 103(c) as amended by Public Law 106-113, § 1000(a)(9) apply to the present application. Section 103(c), as amended, applies to all utility patent applications filed on or after November 29, 1999 and provides:

Subject matter developed by another person, which qualifies as prior art only under one or more of subsections (e), (f), and (g) of section 102 of this title, shall not preclude patentability under this section where the subject matter and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person.

Villanueva et al. issued on **August 25, 1998** from U.S. Patent

Application Serial No. 08/612,640 which is later than the January 27, 1998 priority date of the present application. Accordingly, Villanueva et al. qualifies as prior art against the present application, if at all, only under one or more of subsections (e), (f), and (g) of 35 U.S.C. § 102.

The present application and Villanueva et al. were, at the time the invention of the present application was made, owned by, or subject to an obligation of assignment to KM Europa Metal AG. In this regard, by an assignment that was recorded on December 30, 1999 in the United States Patent and Trademark Office at Reel No. 010495, Frame No. 0791, the present application was assigned to KM Europa Metal AG. Villanueva et al. is assigned on its face to KM Europa Metal Aktiengesellschaft. It is therefore respectfully submitted that Villanueva et al. is disqualified as prior art under 35 U.S.C. § 103(c) for the purposes of determining obviousness under 35 U.S.C. § 103(a). It is therefore respectfully submitted that claim 1 is not rendered unpatentable by Villanueva et al. Withdrawal of the 35 U.S.C. § 103(a) rejection and allowance of claim 1 is therefore respectfully requested.

Notwithstanding the above, Applicants submit that Villanueva et al. do not render obvious claim 1. More specifically, Applicants submit that Villanueva et al. do not disclose, or even suggest, cooling bore holes running parallel to the pouring direction and at least one of running closer to the pouring surface, being configured narrower, and being spaced closer in at least one portion of the die body, as recited in amended claim 1. Therefore, Villanueva et al. do not render obvious claim 1.

Accordingly, withdrawal of the 35 U.S.C. § 103(a) rejection and allowance of claim 1 is respectfully requested.

VII. Rejection of Claims 1 to 5 and 9 Under 35 U.S.C. § 103(a)

Claims 1 to 5 and 9 were rejected under 35 U.S.C. § 103 (a) as unpatentable over WO 97/43063 ("Stagge et al."). Claim 9 has been canceled thus rendering the rejection of this claim moot. Applicants respectfully submit that claims 1 to 5 are not rendered unpatentable by Stagge et al. for the following reasons.

Claim 2 depends from claim 1 and further recites that the form-giving casting die body is made of copper or a copper alloy.

Claim 3 depends from claim 1 and further recites that the casting die body comprises a die cavity (2) defined by two broad-side walls situated opposite each other and two narrow-side walls, the narrow-side walls forming a cross-section of the die cavity; said broad-side walls connected to a base.

Claim 4 ultimately depends from claim 1 and further recites that the cross-section of the die cavity (2) at a first end is greater than at a second end.

Claim 5 ultimately depends from claim 1 and further recites that the broad-side walls further define a funnel running from the first end to the second end. Claim 5 has been amended to recite that the at least one portion of the die body includes both sides of the funnel.

Stagge et al. purportedly relate to a liquid-cooled mold. Stagge et al. state the mold includes side walls 2 including groove-like coolant channels 10, which can be supplied with cool water. See Abstract and p. 6, third par. of the translation provided by the Examiner. Nowhere, however, do Stagge et al. disclose, or even suggest, cooling bore holes running parallel to the pouring direction and at least one of running closer to the pouring surface, being configured narrower, and being spaced closer in at least one portion of the die body, as recited in amended claim 1. Therefore, Stagge et al. do not render obvious claim 1. Accordingly, withdrawal of the 35 U.S.C. § 103(a) rejection and allowance of claim 1 is respectfully requested.

As for claims 2 to 5, which ultimately depend from amended claim 1 and therefore include all of the limitations of amended claim 1, Applicants submit that these claims are patentable for at least the same reasons provided above in support of amended claim 1. *In re Fine, supra* (any dependent claim depending from a non-obvious independent claim is non-obvious). Accordingly, withdrawal of the 35 U.S.C. § 103(a) rejection and allowance of claims 2 to 5 are respectfully requested.

VIII. Rejection of Claims 1 and 9 Under 35 U.S.C. § 103(a)

Claims 1 and 9 were rejected under 35 U.S.C. § 103 (a) as unpatentable over U.S. Patent No. 4,658,884 ("Euler et al."). Claim 9 has been canceled thus rendering the rejection of this claim moot. Applicants respectfully submit that claim 1 is not rendered unpatentable by Euler et al. for the following

reasons.

Euler et al. purportedly relate to a mold for continuous casting of rounds of billets. The mod is state to include a mold wall having cooling grooves 16. See col. 4, lines 14 to 34. Nowhere, however, do Euler et al. disclose, or even suggest, cooling bore holes running parallel to the pouring direction and at least one of running closer to the pouring surface, being configured narrower, and being spaced closer in at least one portion of the die body, as recited in amended claim 1. Therefore, Euler et al. do not render obvious claim 1. Accordingly, withdrawal of the 35 U.S.C. § 103(a) rejection and allowance of claim 1 is respectfully requested.

IX. Rejection of Claims 1 and 9 Under 35 U.S.C. § 103(a)

Claims 1 and 9 were rejected under 35 U.S.C. § 103 (a) as unpatentable over U.S. Patent No. 3,595,302 ("Mallener"). Claim 9 has been canceled thus rendering the rejection of this claim moot. Applicants respectfully submit that claim 1 is not rendered unpatentable by Mallener for the following reasons.

Mallener purportedly relates to a cooling structure for continuous-casting mold. The mold is stated to include mold plates having grooves 16 cut into the rear surface. See col. 2, lines 60 to 73. Nowhere, however, does Mallener disclose, or even suggest, cooling bore holes running parallel to the pouring direction and at least one of running closer to the pouring surface, being configured narrower, and being spaced closer in at least one portion of the die body, as recited in amended claim 1. Therefore, Mallener does not render obvious claim 1. Accordingly, withdrawal of the 35 U.S.C. § 103(a) rejection and allowance of claim 1 is respectfully requested.

X. Rejection of Claims 1, 2 and 9 Under 35 U.S.C. § 103(a)

Claims 1, 2 and 9 were rejected under 35 U.S.C. § 103 (a) as unpatentable over GB 2 177 331 ("Makelainen et al."). Claim 9 has been canceled thus rendering the rejection of this claim moot. Applicants respectfully submit that claims 1 and 2 are not rendered unpatentable by Makelainen et al. for the following reasons.

Makelainen et al. purportedly relate to a continuous casting mold.

The mold is stated to include grooves 2, formed in the working operation of the mold tube blank. Abstract. Nowhere, however, do Makelainen et al. disclose, or even suggest, cooling bore holes running parallel to the pouring direction and at least one of running closer to the pouring surface, being configured narrower, and being spaced closer in at least one portion of the die body, as recited in amended claim 1. Therefore, Makelainen et al. do not render obvious claim 1. Accordingly, withdrawal of the 35 U.S.C. § 103(a) rejection and allowance of claim 1 is respectfully requested.

As for claim 2, which depends on amended claim 1 and therefore includes all of the limitations of amended claim 1, Applicants submit that this claim is patentable for at least the same reasons provided above in support of amended claim 1. *In re Fine, supra* (any dependent claim depending from a non-obvious independent claim is non-obvious). Accordingly, withdrawal of the 35 U.S.C. § 103(a) rejection and allowance of claim 2 is respectfully requested.

XI. Rejection of Claims 1, 2 and 9 Under 35 U.S.C. § 103(a)

Claims 1, 2 and 9 were rejected under 35 U.S.C. § 103 (a) as unpatentable over JP 59-133940 ("JP '940"). Claim 9 has been canceled thus rendering the rejection of this claim moot. Applicants respectfully submit that claims 1 and 2 are not rendered unpatentable by JP '940.

JP '940 purportedly relates to a mold for continuous casting. JP '940 state that the mold including a slit 3 for passage of cooling water. Abstract. Nowhere, however, does JP '940 disclose, or even suggest, cooling bore holes running parallel to the pouring direction and at least one of running closer to the pouring surface, being configured narrower, and being spaced closer in at least one portion of the die body, as recited in amended claim 1. Therefore, JP '940 does not render obvious claim 1. Accordingly, withdrawal of the 35 U.S.C. § 103(a) rejection and allowance of claim 1 is respectfully requested.

As for claim 2, which depends on amended claim 1 and therefore includes all of the limitations of amended claim 1, Applicants submit that this claim is patentable for at least the same reasons provided above in support of amended claim 1. *In re Fine, supra* (any dependent claim depending from a non-obvious independent claim is non-obvious). Accordingly, withdrawal of the

35 U.S.C. § 103(a) rejection and allowance of claim 2 is respectfully requested.

XII. Rejection of Claims 6 and 7 Under 35 U.S.C. § 103(a)

Claims 6 and 7 were rejected under 35 U.S.C. § 103 (a) as unpatentable over Villanueva et al., Stagge et al., Euler et al., Mallener, Makelainen et al., or JP '940 in view of U.S. Patent No. 5,095,970 ("Klein et al."). Applicants respectfully submit that claims 6 and 7 are not rendered unpatentable by Villanueva et al., Stagge et al., Euler et al., Mallener, Makelainen et al., or JP '940 in view of Klein et al.

First, Applicants note, as detailed above, that Villanueva et al. has been removed as a reference.

Claim 6 ultimately depends from claim 1 and, as amended, further recites that the at least one portion extends to cover an area that is at least 20% more than the sides of the funnel.

Claim 7 ultimately depends from claim 1 and, as amended, further recites that the at least one portion extends to cover an area that is 30-60% more than the sides of the funnel.

Klein et al. purportedly relate to a continuous-casting mold for vertically casting metal strip. The mold is stated to include plates 3 having bores directed orthogonally to the body axis 1 through which water flows. See col. 3, lines 17 to 21. Nowhere, however, do Klein et al. disclose cooling bore holes **running parallel to the pouring direction** and at least one of running closer to the pouring surface, being configured narrower, and being spaced closer in at least one portion of the die body, as recited in amended claim 1. As specifically stated by Klein et al, the bore holes run orthogonally to the body axis 1. See col. 3, line 18. Therefore, Klein et al. do not disclose all of the limitations of claims 6 and 7. Nor do Klein et al. cure the above noted deficiencies of Villanueva et al., Stagge et al., Euler et al., Mallener, Makelainen et al., and JP '940.

Claims 6 and 7 ultimately depend from claim 1 and therefore include all of the limitations of amended claim 1. Therefore, Applicants submit that these claims are patentable for at least the same reasons provided above in support of amended claim 1. *In re Fine, supra* (any dependent claim depending from a non-obvious independent claim is non-obvious). Specifically, none of the above

references, disclose, or even suggest, cooling bore holes running parallel to the pouring direction and at least one of running closer to the pouring surface, being configured narrower, and being spaced closer in at least one portion of the die body, as recited in amended claim 1. Further, none of the above reference disclose, or even suggest, that the at least one portion extends to cover an area that is at least 20%, as recited in claim 6, or 30-60%, as recited in claim 7, more than the sides of the funnel. Accordingly, withdrawal of the 35 U.S.C. § 103(a) rejection and allowance of claims 6 and 7 is respectfully requested.

XIII. Rejection of Claims 12, 14 and 15 Under 35 U.S.C. § 103(a)

Claims 12, 14 and 15 were rejected under 35 U.S.C. § 103 (a) as unpatentable over Villanueva et al., Stagge et al., Euler et al., Mallener, Makelainen et al., or JP '940 in view of U.S. Patent No. 5,207,266 ("Nakashima et al."). Applicants respectfully submit that claims 12, 14 and 15 are not rendered unpatentable by Villanueva et al., Stagge et al., Euler et al., Mallener, Makelainen et al., or JP '940 in view of Nakashima et al.

First, Applicants note, as detailed above, that Villanueva et al. has been removed as a reference.

Claim 12 ultimately depends from claim 1 and further recites that the cooling surface comprises a plurality of cooling channels (4).

Claim 14 ultimately depends from claim 1 and further recites, as amended, that the cooling channels are narrower on both sides of the funnel.

Claim 15 ultimately depends from claim 1 and further recites that the cooling bore holes are arranged between the cooling channels (4).

Nakashima et al. purportedly relate to a water-cooled copper casting mold. The mold is stated to include a copper plate having slits 2. See col. 3, lines 9 to 10. Nowhere, however, do Nakashima et al. disclose cooling bore holes running parallel to the pouring direction and at least one of running closer to the pouring surface, being configured narrower, and being spaced closer in at least one portion of the die body, as recited in amended claim 1. Therefore, Nakashima et al. do not disclose all of the limitations of claim 1. Nor do Nakashima et al. cure the above noted deficiencies of Villanueva et al., Stagge et al., Euler et al., Mallener,

Makelainen et al., and JP '940.

Claims 12, 14 and 15 ultimately depend from claim 1 and therefore include all of the limitations of amended claim 1. Therefore, Applicants submit that these claims are patentable for at least the same reasons provided above in support of amended claim 1. *In re Fine, supra* (any dependent claim depending from a non-obvious independent claim is non-obvious). Specifically, none of the above references, disclose, or even suggest, cooling bore holes running parallel to the pouring direction and at least one of running closer to the pouring surface, being configured narrower, and being spaced closer in at least one portion of the die body, as recited in amended claim 1. Further, none of the above reference disclose, or even suggest, cooling channels that are narrower on both sides of the funnel, as recited in claim 14, or cooling bore holes arranged between the cooling channels (4), as recited in claim 15. Accordingly, withdrawal of the 35 U.S.C. § 103(a) rejection and allowance of claims 12, 14 and 15 is respectfully requested.

XIV. New Claim 16

New claim 16 has been added herein. It is respectfully submitted that new claim 16 does not add any new matter (see, for example, original claim 13) and is fully supported by the present application, including the Specification. Because claim 16 contains features analogous to claim 1 it is respectfully submitted that claim 16 is allowable for at least the same reasons submitted above in support of the patentability of claim 1.

XV. Conclusion

It is therefore respectfully submitted that all of the presently pending claims are allowable. All issues raised by the Examiner having been addressed, an early and favorable action on the merits is earnestly solicited.

Respectfully submitted,

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